

THE DEPARTMENT OF HOMELAND SECURITY'S  
SCIENCE AND TECHNOLOGY DIRECTORATE

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HEARING  
BEFORE THE  
SUBCOMMITTEE ON EMERGING  
THREATS, CYBERSECURITY,  
AND SCIENCE AND TECHNOLOGY  
OF THE  
COMMITTEE ON HOMELAND SECURITY  
HOUSE OF REPRESENTATIVES  
ONE HUNDRED ELEVENTH CONGRESS  
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## THE DEPARTMENT OF HOMELAND SECURITY'S SCIENCE AND TECHNOLOGY DIRECTORATE

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Wednesday, March 3, 2010

U.S. HOUSE OF REPRESENTATIVES,  
COMMITTEE ON HOMELAND SECURITY,  
SUBCOMMITTEE ON EMERGING THREATS, CYBERSECURITY, AND  
SCIENCE AND TECHNOLOGY,  
*Washington, DC.*

The subcommittee met, pursuant to call, at 2:43 p.m., in Room 311, Cannon House Office Building, Hon. Yvette D. Clarke [Chairwoman of the subcommittee] presiding.

Present: Representatives Clarke, Luján, Owens, and Lungren.

Ms. CLARKE [presiding]. Good afternoon. The subcommittee is meeting today to receive testimony from Under Secretary Tara O'Toole on the Department of Homeland Security's Science and Technology Directorate.

Dr. O'Toole, we are pleased to have you here today.

The S&T Directorate is a critical element of the Department's efforts to secure the homeland, and I know many of us are eager to hear about your plans and priorities for S&T.

Spurred by the findings of several reports, the committee initiated a comprehensive review of the organization and activities of the Science and Technology Directorate. Our purpose was to identify areas within the directorate that necessitate additional oversight or modifications to legislative authorities.

In doing so, we have received—excuse me, we have reviewed the Homeland Security Act and the Department's use of the authorities of Congress has vested in it. We have also received insight and information from DHS leadership, stakeholders, the R&D community, business leaders, and independent analysts.

It is clear that improvements have been made since the directorate was first stood up. Many of us share the opinion of the National Academy of Public Administration, which stated in its comprehensive review of S&T in 2009 that "S&T has made strides towards becoming a mature and productive research and development organization, particularly during the last 3 years."

S&T research activities have, indeed, created products that are used today by DHS, the first responder community, and infrastructure owners and operators to better secure our homeland. These products are as varied as the Department's mission and include everything from secure USB devices and chemical detection systems

to reports, training modules, and standards. We commend S&T for these activities.

I think we would all agree, however, that despite positive steps forward, much work remains. NAPA concluded in their 2009 report that S&T's ability to fulfill its mission is "limited by the lack of a cohesive strategy, the insularity that defines its culture, and the lack of mechanisms necessary to assess its performance in a systematic way."

This deeply concerns us and squares with the committee's own review. Our analysis suggests that DHS does not have a clear risk-based methodology to determine what projects to fund, how much to fund, and how to evaluate a project's effectiveness or usefulness.

We found that, in spite of investing in hundreds of research projects, most technologies are never transitioned into acquisition programs. This makes it difficult to evaluate the directorate's success in mitigating security vulnerabilities.

Without metrics, it becomes difficult for Congress to justify increases in programmatic funding. That is why I believe this is a crucial time for S&T. S&T will never achieve success unless research rules and metrics are more fully established.

Under Secretary O'Toole, this is your responsibility, and we will judge you based on your achievements in these areas. We look forward to hearing about your efforts to address these issues. We all stand ready to support you and look forward to working with you in the upcoming years.

It is now my pleasure to recognize the Ranking Member, Mr. Lungren, for an opening statement.

Mr. LUNGREN. Thank you very much, Madam Chairwoman.

Welcome, Under Secretary O'Toole. I appreciate the fact that you took some time out to meet with me in my office some time ago, where we could talk about the challenges for your directorate.

I would just say that this is my sixth year on this committee. It is the sixth year of this existence of this as a standing committee. During that period of time, we have grown along with the Department of Homeland Security.

I was thinking the other day, it is sort of like watching a child go through elementary school. You go through the various developmental steps, going from one grade to the other, and you have greater expectations as you proceed forward, as we do of ourselves and as we do of the Department.

I do think there has been progress in the overall Department. I do believe there is greater coordination of the disparate elements that came together to make up the Department.

I do believe that your directorate has a particular challenge, and it is an on-going challenge, and I have even heard more about it since the terrorist attempt on Christmas day, a lot of ideas of people who believe that their companies or their particular ideas should have merit.

They want to make sure that the small entrepreneurial ideas are looked at, as well as those that come out of the large shops, the already existing ones, and I know that is a challenge for those of us who serve on these committees and serve in the Congress. I know it has got to be a tremendous challenge for you.

That is one of the things I hope that you would address today. How do we ensure that we don't lose out on the potential ideas that may be out there that may be out of the box? How do we ensure that those who are not the big boys have an opportunity to present themselves to you, your directorate, and to the Department through you or in other ways?

How do we accelerate the—how do we accelerate the time from an original idea to a testable product to actually having it engaged by contract? The bad guys are out there. They are attempting to try and deal with us in a variety of different ways.

One of the great ways that we have been able to keep ahead of the bad guys, whether they are nation-states or in this case transnational terrorist organizations, is that we have the ingenuity of the American spirit and we have a flexibility or an agility that marks this country.

I am always reminded when I have read Stephen Ambrose's various pieces of work of literature about World War II, that he defined the greatness of our forces with the idea of ingenuity, creativity, thinking out of the box, and the fact that somehow our system of decision-making allowed those ideas to percolate up. He would contrast it with some of our enemy nations and their inability to have that flexibility.

So I would hope that in some way we can capture that spirit of encouraging ingenuity and somehow working through what is inevitable. You have to have a bureaucracy. You have got to make decisions. You have got to make sure that the Government is spending its money wisely.

But having said that, how do we ensure that in that pursuit we also ensure that your doors are open for that thought nobody else has that could be crucial to the decisions that we have to make in the future? I know that is a big challenge for you. I am all ears to find out how you are approaching this.

I want to thank you for your prior service to this Nation and applaud you for taking this assignment and look forward to hearing your words today.

Ms. CLARKE. Thank you, Ranking Member Lungren, for your opening statement.

To other Members of the subcommittee, you are reminded that under the committee rules, opening statements may be submitted for the record.

I now welcome our witness, Under Secretary Tara O'Toole. Dr. O'Toole was confirmed as Under Secretary for Science and Technology in 2009. She is an expert on biological weapons and terrorism. Prior to her appointment, she led the University of Pittsburgh's Center for Biosecurity. She was the director of the Johns Hopkins University Center for Civilian Biodefense Strategies and on the faculty at the School of Hygiene and Public Health.

From 1993 to 1997, Dr. O'Toole served as assistant secretary of energy for Environment, Safety and Health. Dr. O'Toole earned her B.A. from Vassar College and her M.D. from George Washington University.

We are pleased to welcome you to this subcommittee hearing. We appreciate your efforts to respond to the committee's questions in

preparation for our authorization bill. You may now proceed with your opening statement.

Welcome, once again.

**STATEMENT OF TARA O'TOOLE, UNDER SECRETARY FOR  
SCIENCE AND TECHNOLOGY, DEPARTMENT OF HOMELAND  
SECURITY**

Dr. O'TOOLE. Sorry. I ask that my written statement be entered into the record, and I will just give some brief opening remarks.

Ms. CLARKE. Without objection.

Dr. O'TOOLE. Thank you. I have been under secretary for a little less than 4 months now. I believe there is a great deal of value that is going on in the directorate and look forward to increasing that flow of products and knowledge with your help.

We have been engaged in a strategic planning process that I intend to be on-going throughout my tenure, and I want to thank you and your staffs and the other Members for your advice and your concern and your conversations with respect to our strategic planning effort.

I view this hearing as yet another input into the process of building an increasingly productive relationship between the directorate and the committee.

I thought I would comment today on some of the top priorities that I have identified so far for the directorate. First of all, as I tried to illustrate in my written statement, the directorate's work is tremendously diverse, reflecting the huge scope of interest in missions embraced by the Department as a whole, and the even more expansive needs of what we now call the homeland security enterprise, which includes not just DHS and not just Federal agencies, but all the State and local first responders and entities that would be engaged and are engaged every day in protecting the country from terrorism and who would be engaged, should we have to respond to an attack or a National disaster.

The first job of the S&T Directorate, of course, is to develop technologies to meet the operational needs of the DHS components and including first responders. There are three principal ways I have identified thus far wherein this process of technology development might be improved, particularly in the near term.

First, I want to mature and strengthen the integrated product teams, which are the mechanism my predecessor invented for linking the needs of the components, our primary customers, to technology development projects and priorities.

I think this process is key, but I think it can be made much more consistent across the integrated project teams and more analytically rigorous, getting to your comments, Congressman, about the need for a risk-based approach to what we fund.

I also would like to create a space in the Department for thinking more strategically across the Department about science and technology, so not just component by component, but across the Department, what are we doing in identity management, for example? What are we doing in sensor fusion, for example? A lot of our work has similarities in its technological base.

Next, I am very committed to using the directorate's role in the DHS acquisition process to bolster the quality and the efficiency of



technology development across the Department. We have just finalized an acquisition management directive in DHS reflecting the continuing maturation and evolution of the Department as a whole, and I think this is going to be a very powerful tool in governing DHS acquisition programs and making sure that, first of all, we know what we want and we get what we need, without getting to the end of a long development process and discovering that what we have doesn't work and the operational settings for which it was intended or is much more expensive than we had anticipated.

The keys to successful technology acquisition are, first of all, establishing very comprehensive and detailed operational requirements. DHS does not have a long history of doing this, and I think S&T's expertise can help the components in being more successful.

Second, S&T has a statutory responsibility for carrying out independent oversight of developmental and operational testing in homeland security. I would like to emphasize and expand this role of the directorate.

But technology is only one of the important products that S&T puts forth to the homeland security enterprise. We also produce knowledge. As you mentioned, Madam Chairwoman, this comes sometimes in the form of a deepened scientific understanding. It is sometimes in the form of standards, sometimes in protocols.

I believe that first responders in particular benefit from this kind of product, particularly in this constrained budget environment when very few firefighters or police chiefs are going to have a lot of money to spend on technology, and yet they can benefit immediately from, for example, a better way for dealing with white powder incidents. So I am going to put a real emphasis on standards and operation protocol developments.

Next, university programs. We now have 12 university centers of excellence, which are engaging over 200 U.S. colleges and universities in multidisciplinary research and priority DHS mission areas.

These centers of excellence are essential to keeping DHS in touch with cutting-edge research. They are creating expertise in the academic community so that they are familiar with DHS needs, and they are also creating the future workforce not just for the scientific infrastructure of America, but for the Federal Government. I regard that as critically important.

This program suffered a cut in this year's budget. Our pressing near-term priorities and the constrained budget environment forced hard choices between investments in near-term technology development versus longer-term investments in developing basic research.

But I want to assure you that we are very committed to these COEs, which are already showing their mettle in providing valuable services. Last year, these centers of excellence received \$56 million in requests for services outside of their S&T funding. These are other components of DHS going to the COEs and saying, "We would like you to do this, that, and the other thing for us." That is very, very encouraging.

In the next few months, S&T is going to be establishing BOAs, basic ordering agreements, which will give the universities mechanisms for very quickly and easily contracting with DHS components and other Federal agencies so that we can improve the traffic

between these very vital centers of expertise and the Federal community.

We also tried hard to avoid harming the minority-serving institutions disproportionately in this tough budget year. I am very happy to report that the minority-serving institution programs in S&T increased three-fold, from \$2 million to \$6 million, in the years from fiscal year 2007 to 2009 and will be held steady in fiscal year 2011, in spite of our overall budget decrease.

Finally, I want to emphasize the importance of the private sector and S&T's work. As you both pointed out, we have to leverage the private sector's investment in R&D against the needs of DHS.

The private sector makes enormous investments in this regard. Successfully taking advantage of that requires two things. First of all, DHS has to successfully, succinctly, and efficiently communicate its needs to the private sector. Second, businesses have to have access to efficient means of proposing potential technology solutions to DHS for consideration and evaluation.

There are several ways we now approach these tasks. First of all, we do regular outreach to the business community through notices and meetings around the country, including small meetings, such as Chairman Thompson held recently in Kansas, to establish our needs and describe our processes.

We annually publish a document that is on the Web of high-priority technology needs in the Department, and we have a 1-page pamphlet explaining how you can connect to us, and it is quite straightforward.

Probably the most important tool we have is the long-range, broad-area announcement, which allows anyone to submit a very short paper, 2 or 3 pages, proposing their idea. It doesn't require a big investment or a lot of time, like a traditional RFP. We have gotten a lot of return from this.

Since fiscal year 2009, we have gotten 148 white papers; 42 have been selected for contract negotiations. There are on-going negotiations with about 2 dozen companies for a total of \$62 million. So we are definitely interacting with these small agile businesses who are the small innovators.

I mean, we have data showing that the small innovators are much more likely to come up with a new idea than the big corporations. You are completely correct about that. We are trying to reach out to them.

We have also made special efforts to reach small businesses, both through our SBIR program and other means I would be happy to talk to you about.

Just in conclusion, as I said, I am convinced that DHS S&T is of vital importance to the DHS mission and to the country. I look forward to working with you in making it even better, more powerful, and more effective. Thank you, Madam Chairwoman. I would be happy to take questions.

[The statement of Dr. O'Toole follows:]

## PREPARED STATEMENT OF TARA O'TOOLE

MARCH 3, 2010

## INTRODUCTION

Good afternoon, Chairwoman Clark, Congressman Lungren, and distinguished Members of the subcommittee. I am honored to appear before you today on behalf of the Department of Homeland Security (DHS) to report on my plans for strengthening the Science and Technology Directorate's (S&T) efforts to advance the scientific and analytical foundations and deliver the robust technological solutions needed to protect the Nation from natural disasters and terrorist threats.

Since I was confirmed as under secretary for S&T in November, I have been continuously impressed with the breadth and reach of S&T's activities, which reflect the tremendous scope and variety of the Department's missions. S&T serves as the main source of scientific and technological research and development for DHS operating components and has a special obligation to provide knowledge and technologies needed by the Nation's first responders. The Directorate is also charged with assessing and testing homeland security vulnerabilities and possible threats as well as with directing, funding, conducting, and establishing priorities for National research, development, testing, and evaluation of technologies related to the DHS missions.

S&T must address a dynamic spectrum of threats and vulnerabilities across the homeland security enterprise and deliver cost-effective operational and technological solutions to meet a wide array of operational requirements. The S&T mission also requires a robust, rigorous, and disciplined research and development effort to expand our understanding of homeland security challenges, create advanced technologies and develop new ways of thinking about problems and potential solutions.

All of this work should be considered in the context of the newly completed Quadrennial Homeland Security Review (QHSR). The QHSR articulates the homeland security vision and frames the key mission areas encompassed by the DHS components and the greater homeland security enterprise that includes State, local, and Tribal governments as well as the private sector, universities, and individuals. There are five homeland security missions. These are:

- (1) Preventing Terrorism and Enhancing Security;
- (2) Securing and Managing Our Borders;
- (3) Enforcing and Administering Our Immigration Laws;
- (4) Safeguarding and Securing Cyberspace;
- (5) Ensuring Resilience to Disasters.

## DHS MISSIONS

S&T carries out many types of activities and services in pursuit of each of the Department's missions. The Directorate's most obvious work involves developing new technologies and shaping existing technology solutions to fit the operational needs of the enterprise.

S&T is also in the business of creating new knowledge, through sponsorship of basic research, university programs, sustained analyses of technical problems and the construction of research roadmaps, which identify critical information gaps. A particularly important S&T role is the oversight of technology testing and evaluation (T&E). T&E is an essential element of a disciplined acquisition process, and I expect our role to grow in importance. The Directorate also frequently serves as technical consultant to DHS operational components. Further, S&T staff work to stay abreast of and to leverage the extensive R&D work being undertaken by other Government agencies, universities, and private sector organizations, large and small, in the United States and overseas.

The following are a few examples of the different kinds of work S&T is doing to support key DHS missions.

*Mission 1: Preventing Terrorism and Enhancing Security**Aviation Security*

- S&T is collaborating with the Transportation Security Administration (TSA) to improve advanced imaging technology (AIT) to reliably detect passenger-borne threats. A current focus of this long-standing work is on developing software algorithms that could improve contraband detection and reduce both false alarm rates and privacy concerns. Basic standards for this technology have been developed by S&T, and we will leverage this investment to ensure future systems perform as required.

- The Transportation Security Laboratory (TSL) in Atlantic City is expanding its traditional focus on aviation security to address explosive threats to mass transportation. Research there will produce emerging technologies for screening people and identifying improvised explosive devices in mass transit environments.
- TSA is testing software produced at the University Centers of Excellence (COE) to randomize airport searches and checkpoints in order to thwart terrorists' surveillance and attacks.

#### *Protect Critical Infrastructure*

- S&T is developing extremely strong and resilient materials, design procedures, and construction methods that help prevent building collapse due to explosion. Three Small Business Innovative Research (SBIR) awards are also aimed at developing such novel materials. These include nano-enabled spray-on foams; three-dimensional woven textiles; and materials with internal geometric structure, known as microtrusses.

### *Mission 2: Securing and Managing Our Borders*

#### *Detecting Semi-Submersibles*

- Small, self-propelled, semi-submersible boats are carrying illegal drugs and other illicit cargo from South America destined for United States through the transit zone in the Eastern Pacific, an issue that poses a serious emerging threat to homeland security. S&T leads a team of 25 different organizations conducting international field experiments designed to assess current capability and identify shortfalls for detecting, tracking, and interdicting these vessels.

#### *Detecting and Monitoring Tunnels*

- Clandestine cross-border and public infrastructure drainage tunnels are being used as conduits for illegal immigration and smuggling activities. S&T is developing and assessing sensors and surveillance technologies to detect clandestine tunnels and monitor human activity in our subterranean infrastructure.

### *Mission 3: Enforcing and Administering Immigration Laws*

#### *Multiple Biometrics*

- S&T is working to address DHS components' growing requirements for biometric data. Over the next 5 years, DHS's biometrics databases (maintained by US-VISIT, U.S. Customs Border Protection, and others) will grow from systems with data relating to 100 million persons to 500 million persons. S&T is partnering with industry and academia to develop the capability to collect two or more types of biometric data per individual, including fingerprint, face image, and iris recognition. Combining multiple biometric data points will expedite legitimate entry into the United States, enable DHS to search and share biometric data with other agencies, and help to prevent spoof attempts against any one biometric. S&T has funded standards for biometric data formats, quality of images, and exchange of data that are helping US-VISIT work with other U.S. Government and law enforcement agencies.

#### *Kinship Identification*

- To help U.S. Customs and Immigration Services (USCIS) verify citizenship eligibility, S&T is developing a rapid and inexpensive DNA-based kinship test. This development will help USCIS process immigration requests faster and reduce fraudulent applications.

### *Mission 4: Safeguarding and Securing Cyberspace*

#### *Inherently Secure Systems*

- In cybersecurity, most existing solutions involve "patching" an unsecure system. S&T is working to make future cyber systems inherently more secure. Our recently published "Roadmap for Cybersecurity Research" sets a path forward to meet this goal. This work supports the current White House Comprehensive National Cybersecurity Initiative (NCI) and was drafted to be especially useful for private industry, enabling companies to proactively develop solutions to identified problems.

#### *Domain Name Security*

- S&T continues to partner with the DHS National Protection and Programs Directorate, the Office of Management and Budget, the White House Office of Science and Technology Policy, the National Institute of Standards and Technology, and the global internet community to deploy Domain Name System Security Extensions (DNSSEC) onto Government and private sector networks. De-

ployment of this protocol will ensure that when an internet user thinks, for example, they're going to mybank.com, they don't end up at a facsimile site at hackers.net.

#### *Mission 5: Ensuring Resilience to Disasters*

##### *Recovery From Bioterror Attacks*

- S&T is participating in and leading several initiatives that address post-attack environmental event characterization sampling strategies, decision frameworks, and associated concepts of operation. The goal is to formulate a systems approach to restoration focused on reducing time and cost while ensuring the safety of urban areas after bioattacks.

##### *Vaccines Against Foot and Mouth Disease*

- Plum Island Animal Disease Center is developing vaccines and medicines for high-priority Foreign Animal Disease pathogens that will differentiate infected animals from those who are vaccinated. One of our COEs, run by Texas A&M University and Kansas State University, is conducting related basic research on vaccines and disease detection.

##### *Earthquake Warning Systems*

- S&T is working with the Department of Energy (DOE) National Labs and private industry to develop seismic warning models that integrate overhead sensor data into emergency management tools to better predict and plan for earthquakes.

#### *Unifying and Maturing DHS*

In addition to these five explicit mission areas, the QHSR identifies a sixth focus area designed to unify and mature DHS as an organization. The following are examples of S&T activities related to this sixth mission.

##### *Consolidation of DHS Research Activities—Domestic Nuclear Detection Office*

As part of unifying and maturing the Homeland Security Enterprise, the fiscal year 2011 budget proposes to transfer the \$109 million radiological and nuclear transformational and applied research portfolio from the Domestic Nuclear Detection Office (DNDO) into S&T. Consolidating all DHS fundamental research in one component allows efficiencies and will help eliminate gaps, better enable cross-cutting research and more easily leverage economies of scale.

During the integration, S&T and DNDO will conduct in-depth reviews of on-going work to identify the strongest programs for advancement. This will help ensure our focus on the most promising and highest priority research areas. The new Radiological and Nuclear Division in S&T will identify research and develop technologies, processes, and procedures to dramatically improve the performance of nuclear detection components and systems; significantly reduce the operational burden of the radiological/nuclear detection mission; and improve the Nation's capability to respond to and recover from radiological/nuclear attacks.

##### *Building the National Bio and Agro-Defense Facility (NBAF)*

The safety and security of our food supplies are critical to National defense; another aspect of maturing and building S&T's capabilities will be the continuation of our efforts to build the National Bio and Agro-Defense Facility (NBAF). NBAF will be the Nation's first integrated agricultural, zoonotic disease, and public health research, development, testing, and evaluation facility. NBAF will be able to address threats posed by high-consequence zoonotic diseases and foreign animal diseases, such as Foot and Mouth Disease. NBAF will also have a bio-safety level 4 capability, allowing S&T to perform more extensive research on a wider array of some of the most dangerous diseases than our current laboratories allow.

DHS is committed to building a state-of-the-art facility that incorporates all necessary safeguards, both facility-based and procedural, to ensure its safe and secure operation. DHS is completing a comprehensive site-specific risk assessment to develop mitigation strategies and establish the protocols necessary for safe operation. S&T has also contracted with the National Academy of Sciences to perform an independent review of our risk assessment and mitigation plans. NBAF construction will not begin until that review is complete and shared with Congress.

##### *University Centers of Excellence*

S&T will continue to invest in and mature our University Programs and COEs. These efforts harness and leverage the cutting edge research of our universities and create engines of innovation. DHS internships, fellowships, and scholarship programs, such as the Scientific Leadership Awards, help ensure that the necessary

Science, Technology, Engineering and Math graduates are available to help lead the Homeland Security Enterprise into the future.

In order to ensure the development of a science and technology workforce that reflects the diversity of the American people, we continue to grow our outreach to Minority Serving Institutions (MSI). During the past 2 years, we've sharply increased the number of new MSI Scientific Leadership Awards while modifying the program to better reflect the composition of the MSI community by adding categories for institutions focused on Associate's and Bachelor's degree programs. S&T has increased funding by increasing the number of Scientific Leadership Awards and by naming four MSIs to serve as co-lead institutions for COEs.

COE collaborations have made substantial progress and continue to broaden their impact and demonstrate their value in a variety of ways. S&T investment in COEs has attracted the attention of outside funders and resulted in 178 requests for support from other Government agencies in fiscal year 2009. These requests, and the 126 additional requests from DHS components, resulted in more than \$56 million dollars of additional funding in fiscal year 2009, more than doubling the original S&T investment. This ability to leverage the initial investment into outside funding demonstrates the value of their work.

#### S&T DIRECTORATE: MOVING FORWARD

S&T has begun a strategic planning process that I intend to be inclusive and ongoing. I appreciate the observations and suggestions that we have received from Congressional Members and staff, and we will continue to solicit input on how S&T might better serve the Department, the broader Homeland Security Enterprise, and the Nation. The strategic planning process is not finished, but some strategic priorities are already clear.

#### *Capstone Integrated Product Team (IPT) Process*

My predecessor performed an important service in establishing the Capstone Integrated Product Teams (IPTs), which created an explicit way to link the technology needs of DHS' operational components and first responders to S&T's technology development efforts. I intend to build on the customer relationship that S&T has with the operating components and first responders, largely enabled by the Capstone IPT process, and to evolve that relationship into an increasingly collaborative partnership. I would also like to embed more rigor and consistency in the processes used by the IPTs to identify capability gaps and technology development priorities.

#### *First Responder Engagement*

S&T recognizes the importance of the first responder community. They are the Federal, State, local, Tribal, and territorial emergency professionals who prevent, defend against, and mitigate the consequences of terrorist attacks and natural disasters. First responders are a widely diverse group with vastly different needs, resources, and requirements. For example, despite their shared core mission, firefighters in New York City face very different challenges on a day-to-day basis than their counterparts in Muscatine, Iowa. The diverse range of environments in which responders across the country operate creates several challenges to supporting this essential component of the homeland security enterprise.

One way to address this challenge is to expand S&T's engagement with first responders beyond traditional technology development and place more focus on the delivery of information products for use across a broader spectrum of the first responder community. While every first responder may not have the budget to buy emerging technology, nearly all can gain access to the internet to download test reports and other important information on currently available commercial equipment. S&T has established the System Assessment and Validation for Emergency Responder (SAVER) Program within its Test & Evaluation and Standards Division to conduct objective assessments of commercial responder equipment and to provide those results along with other relevant equipment information to the emergency response community. The SAVER Program provides information that enables decision-makers and responders to better select, procure, use, and maintain emergency responder equipment.

S&T also seeks to leverage its testing and standards efforts to vertically integrate products for responders by developing and posting on-line standard operating procedures for incidents, identifying equipment that has been tested and would work well for those procedures, and posting training and certification plans to enable the responder community to more easily integrate it into operational use. While these efforts may not generate the same level of enthusiasm as a new technology would, they can be applied across a much broader swath of the community and could help standardize the response to certain incidents. In the end, this approach potentially

could have a bigger operational impact than efforts to develop technologies with more limited use.

#### *Acquisition Support*

DHS recently implemented Acquisition Directive 102-01, which institutionalizes a disciplined process for DHS technology acquisitions. The directive mandates detailed specification of operational requirements and the conduct of rigorous developmental and operational testing. Implementation of this directive is an important milestone in the maturation of DHS and should promote a more transparent and cost-effective approach to technology development and deployment across the Department.

A key role of S&T at this point in the Department's evolution is to oversee testing and evaluation of complex technologies that the DHS components are seeking to acquire. DHS intends to leverage the private sector's own research investments in commercial technology against the mission needs of the Department, but we must exercise appropriate diligence to determine if the technologies work as anticipated in realistic operational settings. Secretary Napolitano has instructed me to work closely with the DHS Under Secretary for Management and DHS components to ensure that the new Acquisition Directive is implemented in a manner that encourages a more mature approach to technology investments.

#### *Test and Evaluation*

Section 302 of the Homeland Security Act of 2002 charges S&T with the responsibility for "coordinating and integrating all research, development, demonstration, testing, and evaluation activities of the Department." To carry out these and other test and evaluation (T&E)-related legislative mandates, the Directorate established the Test and Evaluation and Standards Division (TSD) in 2006 and created the position of Director of Operational Test & Evaluation in 2008.

TSD develops and implements robust Department-wide T&E policies and procedures. Working with the DHS under secretary for management, TSD approves Test and Evaluation Master Plans that describe the necessary Developmental Test and Evaluation and Operational Test and Evaluation tasks that must be conducted in order to determine system technical performance and operational effectiveness based upon vetted Operational Requirements Documents. The Department's new Acquisition Directive provides the management framework for a robust and comprehensive T&E program.

#### *Leveraging Work of Interagency and International Partners*

In many cases, the challenges faced by the homeland security enterprise are shared by others, and DHS can leverage the work of our interagency, international, and commercial partners to provide the best value for our investments. By leveraging others' science and technology capabilities, S&T can ensure the best products and information are available sooner and at a reduced cost to the U.S. Government.

DHS and the Department of Defense (DOD) in particular share many technical challenges, such as detecting and finding adversaries, locating improvised explosive devices, and protecting cyber networks. DOD has a robust research and development infrastructure to address these challenges, and S&T has developed a strong formal partnership with them through the Capability Development Working Group (CDWG). The CDWG is chaired by the DHS S&T under secretary, the DHS under secretary for management, and the DOD under secretary for acquisition, technology & logistics. The partnership: Ensures the best use of resources and avoids duplication of effort; explores capability development topics of mutual interest and decides on implementation paths; promotes future cooperation; and supports and informs policy, planning, and decision-making.

A focus on aviation security has led S&T to further enhance its partnerships with international groups as well as DOE. Following the failed Dec. 25 bombing attempt, we established the DHS-DOE Aviation Security Enhancement Partnership to develop technical solutions key to aviation security problems. This under secretary-level governance mechanism will manage a strategy to further extend and leverage this relationship, with a focus on improving aviation security. This strategy will:

- deliver key advanced aviation security technologies and knowledge;
- conduct analyses to assess possible vulnerabilities and threats and support/inform technology requirements, policy, planning, and decision-making activities; and
- review the use of existing aviation security technologies and screening procedures, and the impact of new or improved technologies using a systems analysis approach to illuminate gaps, opportunities, and cost-effective investments.

*Working with the Private Sector and Small Business*

In 2008, S&T officially established the Commercialization Office to develop and execute programs and processes that identify, evaluate, and leverage the products and capabilities of the commercial sector. Through the System Efficacy through Commercialization, Utilization, Relevance and Evaluation (SECURE™) Program, an innovative public-private partnership, DHS harnesses the skills, expertise, and resources of industry to develop products and services that align to DHS operational requirements with minimal investment of taxpayer dollars. The program identifies operational requirements as well as the commercial market potential available to businesses if they develop a product that fulfills those requirements. The program provides an entrée, especially for small businesses, into the marketplace of Government equipment and attempts to leverage the internal research and development dollars of industry to solve DHS requirements.

As the 2009 report on The Small Business Economy points out, small businesses are “more likely to develop emerging technologies” than large ones. It is critical for S&T to leverage these innovators for the good of the homeland security enterprise. So far, S&T and DNDO have made 372 Phase I and 122 Phase II awards, totaling \$139 million, to small businesses through the SBIR program. Through fiscal year 2009, we have received 2,300 applications from all 50 States. In order to make sure we are getting the best and most innovative ideas the country has to offer, it is critical that we continue our efforts to reach new small and rural businesses.

## CONCLUSION

I appreciate this opportunity to appear before you today and report on S&T activities relevant to the scope of this subcommittee and outline my plans for aligning the Directorate to the Department’s priorities as articulated in the QHSR.

I am pleased to have the opportunity to strategically guide the Directorate as it advances its efforts to respond to the current threat environment and enable technological capabilities to better protect the American people. Thank you for your time. I look forward to your questions.

Ms. CLARKE. Thank you, Dr. O’Toole.

I will remind each Member that he or she will have 5 minutes to question the panel.

I now recognize myself—excuse me—for 5 minutes.

Dr. O’Toole, I am glad that you sort-of outlined for us in your testimony what some of your priorities are for the directorate. I would like to get a sense of, you know, how will you measure S&T’s success in establishing and really hardening these priorities?

Dr. O’TOOLE. You know, I talked to a lot of people who run R&D organizations before I was confirmed about how to measure success, and they all were extremely consistent. They all said it is really, really hard.

They have different ways of going about it. For example, DARPA, which some would regard as very successful, regards a project manager as unsuccessful if more than 40 percent of his projects actually result in acquired technology, because in DARPA, that is seen as not being risk-taking enough.

I think that would be too stringent a level for S&T, except for our innovation division, where that kind of acquisition rate is probably appropriate, where we try to do leap-ahead technologies.

Another answer I got from a very large R&D corporation—or very large technology corporation who does a lot of R&D is that you have to prove that you are incrementally improving the business or the services that your corporation does everyday. In DHS-speak, that would be, are we providing value to the components? Are we helping them do their work better, more safely, more efficiently, faster, et cetera?

I agree with you. I think one of the things we need to build into our IPTs is our metrics for measuring that more effectively.



The other measures that I heard are: Do you have any money placed against the big bets? Are you managing it in a reasonable way? This usually involves a project management process that very carefully ensures that you are watching the development of a project in which you have invested money. If it starts looking like it is going to succeed, you keep going, but you also have built-in exit ramps so that if you have invested in something that sounded like a good idea, but isn't working out, you get out of it and you go on to something else.

So the short answer to your question is, we need several different kinds of metrics to measure different things. One size is not going to fit all. I think they have to be tailored to the particular objective we have in mind.

Ms. CLARKE. I recognize that, you know, you are all of 4 months into this, but I think one of the challenges with the directorate has been being able to try to really get that tangible—those exit ramps and all the other pieces that you have described.

Is this something that you intend to embed as part of the culture?

Dr. O'TOOLE. Yes.

Ms. CLARKE. Is there a particular preference that you have for the type of metrics that you would like to embed as a practice at the directorate?

Dr. O'TOOLE. It is probably about 60 days too early to answer your question definitively. Some version of all three of those types of metrics I mentioned, I think, are needed, but I will tell you this. We will certainly have more solid metrics for measuring project management.

Ms. CLARKE. Fair enough. Fair enough. In January, you provided timely responses to the committee's questions about the R&D process at DHS, and we want to thank you for that.

Some of the responses confirmed problems that S&T has in selecting research projects. In a response to a question about Capstone IPT process, you stated that S&T is working to further mature the process by improving the consistency and analytical rigor of the decision-making process within each IPT.

Can you provide the committee with more specifics? How, for instance, are you using risk assessments to prioritize projects?

Dr. O'TOOLE. The IPTs differ, for example, in the level of seniority of the representatives from the components who attend. In some cases, I think the enthusiasm of the representatives can drive the conversation. The IPTs always consist of more than one component. They are co-chaired by two components.

But they should—the decisions about priorities, I think, should be driven more by an objective assessment of risk and need and likelihood of success and less by the enthusiasm, if you will, of the people present at the table. So a more kind-of objective approach to what we prioritize out of the individual IPT is needed.

Then we need a more disciplined, rigorous way at the technology oversight group of arraying all of the IPT choices across the Department and figuring out what it is that we should fund on what kind of priority. We are already working on both of those levels.

Ms. CLARKE. Who establishes the risk assessment?

Dr. O'TOOLE. I think that risk assessment has got to be a collective process of S&T and the operators and the leadership of the Department. I recognized the appetite for having some kind of clear algorithm of what our top risks are and the next level, et cetera, et cetera. That is really hard to do in a sensible way that allows one to execute projects.

So, for example, you may have a near-term opportunity to solve three problems at once very quickly. Even though that isn't your highest risk, well, that might be a really good S&T investment.

So S&T, good S&T is a combination of addressing risks in a sensible way and taking advantage of opportunities. Opportunities are often serendipitous. A lot of this demands judgment. We are not going to eliminate judgment. It is never going to be totally objective. But the process ought to be very transparent.

Ms. CLARKE. Thank you. I am over time at this stage, so now I would like to recognize the Ranking Member of the subcommittee, the gentleman from California, Mr. Lungren. Thank you.

Mr. LUNGREN. Thank you very much, Madam Chairwoman, and thank you, Dr. O'Toole, for being here.

I noted in your resumé that you practiced internal medicine for a period of time. My dad was an internist. I am just trying to think what it would be like to have you—to be a patient of yours. I think you would be rather straightforward, and you would probably tell me that I should change my diet.

[Laughter.]

I think I would walk out of there thinking, "I had better do what she says."

Thank you for what you are doing here. I do not want to add to bureaucracy, certainly. But I note that TSA and CBP are not necessarily required to go through your directorate when they purchase technology, but given that that is the case, how do you ensure that your directorate's expertise is leveraged?

Is that sort of relationship-building with the people that are there? Or is there something we need to do? Or is it impossible without creating unnecessary bureaucracy so that, you know, elements like TSA and CBP would be hamstrung in terms of making timely purchases?

Dr. O'TOOLE. Relationship-building is very important because a lot of these technology development acquisition processes go on for years, and they—it really is a team sport. Okay, that is the other thing to remember about technology development. It takes years.

Short-term S&T is 3 to 5 years, until you get a prototype, from idea to prototype, okay? It was 20 years from the first time we ran a locomotive in London until we actually had a railroad, okay? So good ideas don't necessarily translate right away into product. That is one of the reasons it is so difficult to measure the effectiveness of R&D. Couldn't get a railroad until we had wrought iron, which we didn't have when we conceived of the idea.

But I am extremely interested in the acquisition process because of the question you raised. That is a very powerful lever for influencing the acquisition decisions of the components. With this new directive, S&T is now mandated to be part of both the operational requirements which get laid down at the front end of the process and the testing and evaluation that happens at the end of the proc-

ess before we decide to acquire a technology and spend really big bucks on it.

So that is critical. That is a very strong signal of a big maturation step in DHS.

The other question—should we be more tightly linked to the components?—I think can be answered in two ways. One answer would be, yes, okay, there ought to be more crosstalk between S&T and the components when we are in a highly technical area or we are talking about a big complex acquisition.

The nature of that conversation deserves some careful thought. I think the acquisition process will force that conversation in a disciplined way that will be quite constructive.

But the other issue is that we are going to have to build over time a lot more technical expertise, scientific and technical expertise, into the components themselves. I was very struck the last time in Government, which was 16 years ago, by how technical the business of Government has become. I am even more struck by that observation today.

Everything we do is very complicated, is embedded in technology or in scientific findings, and so on and so forth. I am sure you have your own list. We have to build a much more technically fluent Federal workforce than we now have.

DHS is in a good position to do this, because we are going to have to be hiring a lot of young people. That is one of the reasons I am so committed to these internships and fellowships, which I think is a great way of bringing people into Government who normally wouldn't think of it as a career.

Mr. LUNGREN. Let me ask another question. When I was out in California a couple weeks ago, I got an e-mail message that the advanced—I think it is called spectroscopic—

Dr. O'TOOLE. Portal.

Mr. LUNGREN [continuing]. Portal monitor that we had been waiting results on for some time had not passed the test, that that was something that was supposed to be a follow-on to what we have been using for some time at our major ports. Is there any lesson that we learned out of that?

Dr. O'TOOLE. Yes.

Mr. LUNGREN. Or is that success that we took the time to do this and found out that it didn't do what we thought it was going to do? Or is there some way for us to speed that process up? Or is that just the nature of the animal, No. 1?

No. 2, I understand some responsibilities have been transferred from DNDO to you in the budget. What does that mean, in terms of future reviews, studies, et cetera?

Dr. O'TOOLE. To take your latter question first, the R&D portion of the Domestic Nuclear Detection Office is going to be transferred to S&T in fiscal year 2011. That is \$109 million or so. I think that is a good thing. It gives us the full suite now in S&T of R&D, including rad-nuke, and it allows us to do robust, multidisciplinary R&D across the Department.

I would regard the recent decision on ASP, as we call it—

Mr. LUNGREN. That is easier for me to say.

Ms. O'TOOLE [continuing]. A victory. Yes. As a victory. It is, first of all, going to be used, but in secondary screening. We determined

with considerable precision and objectivity that it is effective, it does what we want it to do, and it is cost-effective in that operational setting.

It is not a cost-effective solution for primary screening. We shouldn't put every cargo container that comes into a port through ASP right away. If in the initial screening looks funny, then it goes to ASP, and that is a good way to do it. That is smart screening.

So it is a success in that sense. It took a long time. It takes a long time. We had to build this technology. We had to test it at ports, which had very high throughput. It is very difficult to actually interrupt the operations of ports without being very intrusive, i.e., expensive.

But I think the full story of ASP in the last 2 years is actually a story of doing it right.

Ms. CLARKE. Thank you, Mr. Lungren.

I now recognize the gentleman from New Mexico, Mr. Luján, for 5 minutes.

Mr. LUJÁN. Madam Chairwoman, thank you very much.

Dr. O'Toole, thank you for being here, as well. The enabling legislation for DHS makes specific reference to the ability of the Science and Technology division to tap into the expertise resident in DOE and NSC laboratories. Dr. O'Toole, I would be interested in your perspective on the interactions between your office and the NNSA facilities and whether you would like this to be a true partnership rather than a short-term fee-for-service arrangement.

Dr. O'TOOLE. Thank you for the question. I think the relationship is robust. A significant portion of our budget is invested in the laboratories. We just established a new aviation security partnership with the labs to look at three different aspects of aviation security that I think are going to be very important to the Nation and are quite long-term, at least in terms of what it is going to take to bring them to true fruition.

I certainly don't have complaints with the laboratories so far. I think—I know them well from past experiences. I have had a lot of conversations already with folks from the labs.

I think we could work on the same problem we talked about in the private sector. How do we know what they have got and we need and vice versa? That is kind of an on-going challenge, and we just have to keep oiling that machine.

But I think the—as I said, I think the relationship is quite robust.

Mr. LUJÁN. Well, I appreciate that very much, Dr. O'Toole. As we look to the National labs and to other entities that we have made sizable investments in, I certainly hope that we engage more with DOE specifically and NNSA facilities to help solve some of these problems and to look at their modeling, their simulation, computing capabilities to be able to understand the systems-wide problems that we are trying to work on to engage in these technologies, sometimes where it is for rain imaging, and then we find out that there is another application that TSA can employ.

Following up on some similar questions, regarding the aviation security enhancement program between DHS and DOE, how will this program affect S&T's ability to partner with NNSA laboratories and transition new technologies to deploy to TSA, as opposed

to bogging things down? Will this allow us to move forward in a way that these technologies will help get into market sooner, rather than later?

Dr. O'TOOLE. Yes.

Mr. LUJÁN. Very good. On the topic of domestic nuclear detection with DNDO, I understand a number of changes that are being proposed that we just spoke about, as well, that the R&D elements will move into your directorate, as this takes place, is DHS ready to take full advantage of the laboratory? Are they willing to take full advantage of the expertise that we have at some of the NSA facilities to help meet those needs?

Dr. O'TOOLE. I believe so, Congressman. I don't see any obstacles. We are going to do a program review of the DNDO portfolio, so we understand what is there and we keep the best of it, and if we need to change things around, we do that.

We haven't undertaken that yet, so I have a general knowledge of what is in DNDO. I have talked to the current acting director at some length, and I have read all the paper, but that might be a question best asked, again, in another 60 days.

Mr. LUJÁN. I appreciate that very much, Dr. O'Toole.

Madam Chairwoman, you know, as we bring some of these questions forward and we identify some of these problems, you can see the passion that I have, but the belief that our scientists, our physicists, our researchers, and our National laboratory system, investments that we have made, places and people that have solved great problems, that the more that we engage with them and that we allow for these synergies to take place between DHS, DOE, DOD, to be able to bring these to application and truly be able to harness the ability and streamline the process associated with commercialization of some of these technologies to allow them to solve these problems, wherever they may be across the country, not only will we be creating jobs and allowing for the domestic manufacturing to be built again, but we are going to be able to arm a lot of people with safer environments to be able to make a difference.

That is why I emphasize this with Dr. O'Toole. I am anxious to see where we go from here. I am very pleased with your responses, Dr. O'Toole, as far as the commitment to be able to work in a very close way with our DOE and NSA facilities.

Thank you very much, Madam Chairwoman. I yield back my time.

Ms. CLARKE. Thank you, Mr. Luján. Your insight into the use and application of our National labs as it relates to homeland security, I think, is a very keen observation that we need to emphasize more and more each day.

We do have expertise resident in these labs around our Nation, of which you are keenly aware and very engaged with already, Dr. O'Toole. I guess it is sort of connecting the dots and some of the information-sharing that we are always hearing about that is always the challenge, but we look forward to your continued advocacy and see how we can, you know, make this come to fruition in a much more tangible way, ways that I think we will see that next generation of individuals going into our labs and sharing that responsibility with our S&T Directorate to bring out those products that we need.

Having said that, I would like to acknowledge the gentleman from New York, one of our newest Members, Mr. Owens—

Mr. OWENS. Thank you, Madam Chairwoman.

Ms. CLARKE [continuing]. For 5 minutes. Sure.

Mr. OWENS. I would like to go back to something that you mentioned in your testimony, and that is, how are we going to make available the procurement process to small businesses, innovative folks, and at the same time protect the Department from the point of view of the small businesses' ability to perform once engaged?

Dr. O'TOOLE. That is an important question. There are some success stories here, but what you are highlighting is a fairly common conundrum, where you have a small business that has a terrifically innovative idea that looks like it may solve a problem that we have, but they do not have the resources, whether it be the accounting systems or the capital to build a big production system, to actually bring that idea even to prototype.

What we have done in the past—and what I would like to do more of—is play matchmaker and pair those small businesses with larger concerns who can help shepherd the product through at least a prototype so we can get a good look at it and test it.

We just did this recently with the third-generation BioWatch system, an environmental sensor for biological weapons that is not yet deployed. It is just going into testing now. We had a very innovative small business who had some great ideas, and we paired them with—I think it was Northrop Grumman.

They ended up being one of the two candidates being selected for further testing. But that often happens, that the small businesses can get so far, and then they need help. That is the other reason for the long-range BAA. They often just don't have the capital of the time of the people to develop a full-blown request for proposal response.

So with these brief white papers, we are trying to give them an opportunity to get their ideas in front of us.

Mr. OWENS. Thank you. How well is that known, the process, the marrying process that you talked about, in the small-business community?

Dr. O'TOOLE. I don't know the answer to that. But I will tell you what, it is a good question, and we will put it into the pamphlet that describes how to work with S&T.

Mr. OWENS. I think that is very important.

Dr. O'TOOLE. Yes, you are right.

Mr. OWENS. I have another question.

Dr. O'TOOLE. If I could just mention, since you brought it up and you are thinking of authorizing—of reauthorizing S&T, we use the other transition authority a lot to get these non-traditional companies who don't usually contract with the Government into the game.

It is—you have been very generous in reauthorizing it every year. Having that as permanent authority would be actually helpful, because it is the way you engage these small businesses, often-times.

Mr. OWENS. Again, thank you. Again, I think that it is very important to engage small businesses in this process.

Another question that is somewhat related, but maybe not fully. Are you working on a management directive detailing how basic and applied homeland security research is identified, prioritized, funded, and evaluated by your directorate?

Dr. O'TOOLE. No.

Mr. OWENS. Is that something that the Secretary may be working on?

Dr. O'TOOLE. We are having conversations with the Secretary's office about how to structure little S and little T in DHS more effectively, i.e., including what the components do, but I haven't at least been in conversations about a particular directive——

Mr. OWENS. Okay, thank you.

Ms. O'TOOLE [continuing]. That would codify that.

Mr. OWENS. Where are we at in the process of testing the next generation of AIT equipment? When do you think it will be deployed in the Nation's airports?

Dr. O'TOOLE. It depends on what you mean by next generation. The way TSA has decided to proceed is that it is going to put into the field the current generation of imaging machines, which we all agree are imperfect but better than nothing, and then we are going to try and incrementally improve those machines, for example, by adding algorithms for automatic targeting, which we are working on now.

The checkpoint—the whole checkpoint, not just one machine, but the whole experience from the moment you walk into the airport until you get on the airplane, is currently, the focus of one of the lab projects that I was just referring to, we are doing a systems analysis of that whole experience to figure out, where is the low-hanging fruit? What might we do right away? What are the big problems which, if solved, change the world, okay?

So there are things going on in S&T and in TSA on all of those different levels. We are certainly looking at entirely new technology approaches to imaging. One of the projects in Los Alamos, for example, uses low-energy magnetic resonance technology instead of the current X-rays or millimeter wave technologies.

That may be dynamite. It is looking pretty good in the lab. Sometimes things that happen in the lab aren't so good in the messy operational environments of airports. These are very low-energy waves, these MRI things that we are using. What happens when you put it around all the metal at checkpoint, we will have to wait and see.

Mr. OWENS. Thank you very much for your analytical answers and responses and for your good work. Thanks very much.

Mr. LUJÁN. Mr. Owens, would you yield briefly on that?

Mr. OWENS. I think my time is expired, so I have no problem yielding.

Mr. LUJÁN. Madam Chairwoman, just to add a quick thought?

Ms. CLARKE. Sure. Go ahead, Mr. Luján.

Mr. LUJÁN. I just want to mention that that technology is being tested in an airport, as well.

Dr. O'TOOLE. That is correct——

Mr. LUJÁN. So we have seen it in application and in use. Thank you, Madam Chairwoman.

Ms. CLARKE. There are still a couple of additional questions that my colleagues have, so we want to go around for another round of questioning with you, but I wanted to get back to a question raised by Mr. Owens about management director, because in response to us, it was stated that you are currently formalizing the Capstone IPT process with roles and responsibilities through a DHS management directive.

Is that still in play?

Dr. O'TOOLE. Yes. Sorry. Yes, I misunderstood.

Ms. CLARKE. Okay. All right. Let me ask you then about the NAPA findings. We intend on incorporating many of the NAPA findings in our authorization bill. One of the NAPA's findings suggest that S&T establish a system to monitor and account for homeland security research, milestones, and create a formal process for collecting feedback from customers and end users on the effectiveness of the technology or service delivered by S&T.

I know many of us were surprised to hear that these processes are not already in place, but what specifically are you doing to implement this recommendation?

Dr. O'TOOLE. You know, I read the NAPA report very carefully, and I spent a lot of time with the principal authors and found it a very valuable document. I think on that, they were mistaken.

There is no single system that gets feedback from customers, but there is a lot of feedback. It may be that we need to codify that and integrate it and make it a little bit more quantitative, but, again, it is a really different thing to ask a first responder if they found a protocol to be useful or accurate—I am not sure which question would be appropriate—versus asking a component whether they found our testing and evaluation to be helpful or overly tough versus asking whether a deployed technology, once it is handed off to the components, actually met the need as expected.

There are many different questions that have to be posed. This one-size-fits-all metric system that NAPA was after does not, I believe, exist, alas. I mean, life would be much easier if it did.

But I do think we are going to have to set up a variety of feedback systems to figure out how we are doing. It is basically the other side of your metrics question, Madam Chairwoman. There is no easy fix. We have to do a number of things.

Ms. CLARKE. It is not a one-size-fits-all.

Dr. O'TOOLE. No. You know, In-Q-Tel, for example, which has been in this business for a few years trying to help the intelligence community, particularly with information technologies, is run by some very sophisticated people out of the private sector who have a lot of venture capital experience.

I asked them. I said, well, what are your metrics? They have a similar mission to S&T. They said, "We don't know what to measure, so we measure everything and try to make sense of it." They have like 20 different things that they actually keep track of. I think that is what we are going to do for another year or 2.

Ms. CLARKE. According to a recently released quadrennial homeland security review, the Department has five homeland security missions, one of which is safeguarding and securing cyberspace, yet the President's fiscal year 2011 request for cybersecurity research within S&T is \$36 million, a \$2 million decrease from last year.



Why is a fundamental mission area like cybersecurity being funded at such a low level? Do you anticipate reprioritizing future S&T budgets to reflect the significance of the cyber mission?

Dr. O'TOOLE. I think the cyber mission is extremely important. It actually stayed even, except for an earmark, compared to last year in S&T. It has grown 300 percent in 3 years.

So \$36 million is not a lot of money compared to the size of the problem. It is a fairly significant chunk of money in S&T terms. We went to great lengths to protect it even in this constrained budget environment.

Ms. CLARKE. Thank you, Dr. O'Toole.

I now yield—excuse me, I now recognize the Ranking Member of the subcommittee, the gentleman from California, Mr. Lungren.

Mr. LUNGREN. Thank you very much.

Dr. O'Toole, you mentioned in your opening statement about the white paper process, and then further speaking, when Mr. Owens asked you questions about small business. Can you tell me a little bit more about that white paper process? The reason why I say that is, I do have people who come to me who purport to represent smaller companies, who believe that they have certain unique approaches to things.

I have particularly been—had a number of people contact me on this whole area of advanced imaging technology, sometimes in the area of passive millimeter wave technology and others.

I am no expert. I listen to what they have to say. I take a look at it. I try and see whether it makes much—whether it makes sense. If it does, I want to make sure at least they are being heard.

What would your suggestion be if we do have people who are relatively small business, entrepreneurial organizations, how they should proceed? For some of them, DHS is a rather large entity. What would the suggestion be?

Dr. O'TOOLE. Well, I have a stack of these 1-page pamphlets called a quick look guide to doing business with S&T. I can give them all to you or we can spread them around the committee. I am serious.

Mr. LUNGREN. No, that would be very helpful, because that is the kind of thing—

Dr. O'TOOLE. I would appreciate it if you would let your constituents know how to get in touch with us. This is one of the ways we are going to connect. I mean, it is obvious that we think calling their Members of Congress is a good way to connect with the Government, and it should be.

So we would like to make that easy for you. As you will see from this guide, which is pretty straightforward, depending upon what they have got and whether or not they really want to talk to S&T, there are a number of ways they can go.

One common confusion is small companies think they actually have a product that is ready to be bought, so they have a better millimeter wave than the one we are using. That should go to TSA, because we develop technology. If it is already developed and ready for market, it is not our deal. That is the first declension.

Second, it depends upon whether or not they think they have a fix for a particular problem. In the commercialization office, for example, we publish a lot of operational requirements documents

that say, “We have this need,” and they describe it pretty thoroughly. If you think you have a fix, Mr. Businessman, then we want to talk to you in the commercialization office. If it really looks like a fix, we may even help you test and develop your product.

So if you think you have a real near-term fix to a defined need, that is one route. If you have a wilder idea, okay—forget about these millimeter wave technologies. Forget about X-ray. I have got a whole new energy system that I think can solve your checkpoint problem. That is probably a white paper exercise.

Mr. LUNGREN. Oh, I got it.

Dr. O'TOOLE. Okay? So there are different flavors of solutions that people want to present. We try to be very clear and very direct in which portal to walk through with the greater sense of success.

We have also gone out and talked to people about what we want in the white paper. We want to know who your team is. We want to know your analytical argument for the proposal you are making. You know, some simple things like that make a big difference in our capacity to understand what is being proposed.

Mr. LUNGREN. That is very helpful. I appreciate that. Let me ask this. Look, nobody ever has the budget they wish they would have. We have true budget problems now. I don't think we are even seriously addressing them.

But nonetheless, when I look at the budget proposals and your statement, the 2011 budget request for chemical and biological within your directorate is slightly decreased from the 2011 level. The Congressional justification given in the budget is that the decrease reflects “the funding of higher-priority items within the Department.” I know it is always trying to figure it out.

But in light of this decreased budget request and the statement that there are other priorities, can you explain what your plan is for chemical and biological programs going forward? One of the reasons I ask that is, if you look at the WMD commission, it reiterated the importance of biodefense. I know you know that well.

It is, it seems to me, a call to us in Congress to take it seriously. So given that, what are your plans going forward within your budget constraints?

Dr. O'TOOLE. Well, I certainly share the concern about the biothreat. I think it is one of the gravest that the Nation faces, along with cyber and possibly an IND, improvised nuclear device.

The cut in the chem-bio program, which is the oldest and the biggest program in S&T, really impinged upon some information analytics that we were doing for the Office of Health Affairs. It was in support of a program called NBIC, the National Biosurveillance Information Center, and the assistant secretary for health affairs has decided to pause in that program, which has been problematic for a long time—it is never really gotten a lot of momentum for reasons that have been described by GAO and others—and re-think it strategically.

So by cutting the money we were putting into an analytic technology, we basically ended up doing very little, if any harm to any program involving bio or chem.

In the future, I think the bio program needs to stay extremely robust, because to a large extent, the S&T program anchors a lot of essential activity in the Government, such as, for example, the

analytics and the laboratory assays behind what we would do post-attack to determine the extent of the contamination, if it were anthrax for example, and how to clean it up, okay?

That is really DHS doing that. We are doing it with partners in the interagency, but we are the anchor. S&T's chem-bio division has actually become a very robust interagency nexus of work in the bio arena, and that, too, needs to proceed, but there is a long list of to-dos. You are quite right.

Mr. LUNGREN. Thank you.

Ms. CLARKE. I now recognize the gentleman from New Mexico, Mr. Luján, for 5 minutes.

Mr. LUJÁN. Thank you very much, Madam Chairwoman.

Just one last thought or question, if you will, Dr. O'Toole, building off a question that Mr. Owens asked, looking at the new imaging technology that we are currently exploring and seeing what we are going to do with AITs.

I would request that your office would get a briefing from Los Alamos National Laboratories around the technology that is separate from AVIS, but which I believe, based on the information that I was presented with, would allow us to be able to meet many of our needs, address some of the privacy concerns, if not all of the privacy concerns, but truly allow us to see what needs to be seen, as well, and do it in a timely fashion, which would allow us to meet these needs.

I understand that this is a spin-off of a different set of R&D that was taking place, but that there is currently not a customer in this area which will restrict our ability to move this technology forward, but based on your expertise and those around you, would ask for that consideration just going forward.

Dr. O'TOOLE. Okay.

Mr. LUJÁN. Thank you very much, Madam Chairwoman. I yield back my time.

Ms. CLARKE. Thank you. I would like to just let you know that I share the concerns of Ranking Member Lungren and Mr. Owens about the small-business concerns. I hope that some of the provisions within our authorization bill will also help address these concerns.

It is a comment that we hear pretty frequently, you know, from people who just visit us, actually, on the Hill. They don't even have to necessarily be constituents. They will seek us out, because they know we are on the Homeland Security Committee.

I guess sort of creating as many corridors based upon, as you said, I guess the level of development or the intent of the particular individual, enables us to hopefully not overlook something that may be of great value to the work that we do.

We would like to also just—you know, we are here to partner with you. We know that you are, you know, 4 months in, but there has been a lot of concern that this directorate is not where we hope it to be, where we want it to be, given its critical interaction with all of the components.

The on-going scrutiny that we get, particularly when it comes to coming up with solutions for the homeland security challenges that we face, inevitably people want to know what the S&T Directorate is doing. So we would like to be as helpful in strategic planning

and perhaps even aligning some of what we are looking at in terms of the authorization bill with some of the aspirations of you and your team.

Then, finally, you talked a little bit about the need to sort of look at how we establish some of these metrics. I hope that you will get back to us, once you have given it more thought, sort of looked at the lay of the land, with some of your observations and where you think you can be as a baseline in terms of metrics going forward.

Dr. O'TOOLE. Yes.

Ms. CLARKE. I want to thank you, Dr. O'Toole, for bringing your talent and expertise to bear in this area. It is great to see that women are right there in the forefront making it happen.

Mr. Lungren liked that one.

Mr. LUNGREN. I like the fact that internal medicine specialists—

Ms. CLARKE. That, too. We look forward to your work going forward in the future.

Let me just close by saying that the Members of the subcommittee may have additional questions for you, and we will ask you to respond expeditiously in writing to those questions.

Hearing no further business, the subcommittee stands adjourned.

[Whereupon, at 3:49 p.m., the subcommittee was adjourned.]

## APPENDIX

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QUESTIONS FROM CHAIRWOMAN YVETTE D. CLARKE OF NEW YORK FOR TARA O'TOOLE, UNDER SECRETARY FOR SCIENCE & TECHNOLOGY, DEPARTMENT OF HOMELAND SECURITY

*Question 1.* What specific steps are you taking to make the integrated project teams more analytically rigorous?

Answer. As the Science and Technology Directorate (S&T) does periodic (roughly semi-annual) reviews of the Integrated Project Teams (IPTs) and their programs, we are alert to instances where the requirements and the corresponding risk analyses might need to be more rigorously examined to ensure that sound judgments can be made on programs. As such instances are identified, a team of analysts, experienced in requirements analysis and risk evaluation, is assigned from the Homeland Security Studies and Analysis Institute (HSSAI), one of the Department of Homeland Security (DHS) Federally Funded Research and Development Centers (FFRDCs), to work with the scientific staff to reconsider and strengthen the analytic basis of the programs. Eventually, S&T anticipates that this procedure will provide a basis for comparative evaluation across IPTs as well.

*Question 2.* You gave conflicting responses to the committee when asked if DHS was creating a management directive formalizing the Capstone IPT.

Is DHS creating a management directive? If so, please provide any relevant details, including expected release date.

Answer. During testimony, two different questions were asked. Congressman Owens asked if there was a management directive being formulated specifically for research. There is no Department-wide guidance currently being formulated for research.

Chairwoman Clarke's question referred to a management directive for formalizing the IPT process, which directs our Transition portfolio. Science and Technology Directorate (S&T) has drafted a management directive and believes it will be a useful tool for increasing the transparency and rigor of the IPTs. However, while the formal structure of the IPTs is still under review, this management directive is still being reworked. The focus of this guidance is on the Capstone IPTs, and does not encompass basic research. It will describe the roles and responsibilities between the S&T and our customers for the Transition Portfolio. I expect it to be in place by the start of fiscal year 2011.

*Question 3.* You described the current DHS risk assessment process as a collective one, bringing S&T, the operators, and the leadership of the Department together.

Do all components perform their own assessment of risk and threat today?

If so, how do you baseline this across the Department to determine which activities should be funded?

What efforts are underway at the Department to baseline these activities?

Answer. Many directorates, offices, and components across the Department of Homeland Security (DHS) conduct analyses or assessments related to risk, threat, vulnerability, and/or consequences as means to inform strategic and operational planning, and to support decision-making specific to their mission. Since these assessments are necessarily tailored for the specific decision contexts and needs of their leadership, they appropriately use differing sources and granularity of data, different assessment methodologies and approaches, and report results in ways that are most useful to them. For example, the United States Coast Guard conducts the National Maritime Strategic Risk Assessment (NMSRA) and the Maritime Security Risk Analysis Model (MSRAM) to influence strategic and operational plans, and in execution of tactical operations.

Consequently, since these intra-component assessments are designed to support specific needs and decisions, it is generally difficult to compare assessment results or findings across these assessments unless they are designed to do so in a consistent manner. To address this, the Office of Risk Management and Analysis

(RMA), in conjunction with partners from across DHS and the homeland security enterprise—including Federal, State, local, Tribal and territorial government organizations, the private sector and our international partners—is working to achieve a consistent and integrated approach to risk management that will increase the effectiveness of homeland security risk management. RMA has taken several critical first steps for building and institutionalizing integrated risk management. The office established a risk governance process with the DHS Risk Steering Committee (RSC), with membership from all components and offices in DHS. The RSC, which meets at three levels, including component leadership, ensures that there is collaboration, information-sharing, and consensus-building across the Department as we identify and integrate best practices for risk management and analysis. In September 2008, the RSC published a DHS Risk Lexicon that establishes a common language for discussing risk-related concepts and techniques, and then in January 2009 released an *Interim Integrated Risk Management Framework* that sets the foundation for a common approach to homeland security risk management.

RMA also conducts strategic all-hazards risk assessments that are designed to inform the prioritization of risks and resource allocation across the diverse mission sets within the Department. Specifically, the Risk Assessment Process for Informed Decision Making (RAPID), to be finalized in the spring of 2010, is the first quantitative all-hazards assessment of risk, and is being conducted to support strategic and budgetary decision making in DHS. While RAPID is not an aggregation or “roll up” of other Department assessments, it uses and leverages data and results from those assessments as much as possible in its analysis to support decisions about planning, programming, and budgeting. RAPID will deliver three products in 2010: (1) A quantitative all-hazards assessment of risk, (2) a detailed mapping of most DHS programs to a range of all-hazards scenarios, and (3) an estimate of the risk reduction afforded by those programs.

*Question 4.* What specific efforts will you undertake to create a risk-based approach for research funding?

Answer. Risk has been identified as a fundamental consideration in decision-making across the Department of Homeland Security (DHS) and the larger National homeland security enterprise. Primary responsibility for consideration of societal outcome risks starts with those agencies and entities responsible for achieving homeland security outcome goals. Included among those responsible are the DHS components; other Federal agencies and departments with homeland security responsibilities; Government agencies at the State, local, territorial, and Tribal levels; and private sector entities such as owners and operators of critical infrastructure. These agencies and entities identify gaps in their capabilities to meet mission performance expectations. The Science and Technology Directorate's (S&T) Capstone Integrated Product Team (IPT) process brings these stakeholders together to identify and prioritize capability gaps for which technology solutions and research & development are necessary or potentially fruitful. Through the IPT process, homeland security stakeholders share their risk assessments with S&T.

In addition, S&T is committed to working with other elements of DHS and the larger National homeland security enterprise to improve our collective understanding of homeland security risks and to develop and execute better methods, tools and processes for analyzing and communicating needed risk information.

- S&T's research divisions are active partners with other elements of DHS and the larger National homeland security enterprise in carrying out assessments of various risks. For example, S&T's Chemical and Biological Division has the lead responsibility for biennial, systematic end-to-end risk assessments on both traditional and advanced biological agents, known as Bioterrorism Risk Assessments (BTRA).
- S&T is actively working with the Office of Risk Management and Analysis in the National Protection and Programs Directorate to improve DHS's understanding of risk management and analysis, the Department's risk lexicon, its risk education and training capacity. S&T is also sponsoring active research into analysis of complex-adaptive system risks, cross-community collaboration in risk analysis and analyses of alternative courses of action assessing multiple attributes including effectiveness, cost, and sustainability.

*Question 5.* What do you believe is the appropriate percentage for DHS S&T projects resulting in acquired technology?

Answer. Research and development (R&D) is not a linear process and, therefore, linear metrics, such as a percentage of projects that will result in technology acquisition, are not measurable or appropriate. However, the Science and Technology Directorate (S&T) does measure progress toward achieving success on R&D projects. S&T has a goal of achieving 75 percent or higher of all project milestones each year. Program Managers measure performance by establishing milestones at the begin-

ning of a project that reflect the key achievements needed to reach a desired end-state. Included in those milestones are decision points that indicate whether a project should continue or be terminated.

S&T has a diverse investment portfolio. Transition programs represent approximately 50 percent of the R&D within S&T. These projects are lower risk efforts designed to deliver products to acquisition programs across the homeland security enterprise within 3 to 5 years. The S&T Innovation investment represents less than 10 percent of the R&D funding and those projects are designed to take on higher risk projects than an acquisition program can accept with the potential for higher pay-off than the acquisition program expects to receive. The basic research investment accounts for approximately 20 percent of S&T budget and is funding efforts that are looking at the phenomenology and basic science that will lead to the development of the next generation of homeland security technology. The remaining funds are dedicated to the operation of the S&T laboratories, construction, SAFETY Act, and other functional programs that enable research, development, testing and evaluation, and further the homeland security position of the country.

*Question 6.* During the hearing, you stated that “we need several different kinds of metrics to measure different things.”

Can you give us specific examples of the kinds of metrics that currently exist at S&T, and the metrics you intend to implement as Under Secretary?

When will the results of the National Academy study on portfolio metrics be released?

Answer. The Science and Technology Directorate (S&T) tracks two levels of performance metrics. One level is Government Performance Results Act (GPRA) Measures. The GPRA measures are high-level outcome measures that demonstrate progress toward achieving project success. The key GPRA measure is percent of program milestones met. Program Managers measure performance by establishing milestones at the beginning of a project that reflect the key achievements needed to reach a desired end-state. To make measures more meaningful S&T has tied Senior Executive Service (SES) performance plans and bonuses to the end-of-year results of the divisions’ GPRA performance measures of achieving milestones.

In addition to the GPRA measures, S&T had hundreds of detailed internal management measures that the divisions use to gauge program progress. These measures are based on a comprehensive programmatic and technical review to improve the performance of individual activities within projects. This process helps S&T ensure the viability and vitality of individual programs and projects.

To help improve S&T program performance metrics, S&T contracted with the National Academy of Science (NAS) to develop a framework of metrics for S&T to better plan and evaluate its research activities. An important element of R&D planning is development of appropriate metrics, defined as a system of measures of the impact of research, to inform evaluation and improved decision-making. The NAS study began in April 2009 and selected the members of the committee in August, 2009. The committee, chaired by Dr. Carl Pister, held its first meeting on September 1 and 2, 2009. The study is scheduled to conclude in April, 2011.

Looking ahead S&T is engaging a third party to perform an initial, independent portfolio analysis. The result will be a process and method for repeatable portfolio analysis. The selection of the portfolio analysis performer is expected in early April 2010. Portfolio analysis will allow S&T to improve the efficacy and efficiency of its research investment.

*Question 7.* With regard to assessing S&T performance, you stated that “there would be different processes to ask a first responder if they found a protocol to be useful or accurate, versus asking a component whether they found S&T testing and evaluation to be helpful versus whether a deployed technology actually met the need as expected.” You also stated that you are going to have to set up a variety of feedback systems to figure out how we are doing.

Please describe specific steps you are taking to create these feedback systems. What current systems exist at S&T for these purposes already?

Answer. The Science and Technology Directorate (S&T) has several current feedback systems with which to assess performance related to first responder technologies and knowledge products. They include:

- S&T established the First Responder Capstone Integrated Product Team to provide solutions that address capability gaps identified by Federal, State, local, territorial, and Tribal first responders.
- S&T assumed responsibility, in fiscal year 2009, for the management and funding of the former FEMA System Assessment and Validation for Emergency Responders (SAVER) Program. The SAVER Program conducts objective assessments and validations on commercial equipment and systems and provides those results along with other relevant equipment information to the emergency

response community in an operationally useful form. SAVER provides information on equipment that falls within the categories listed in DHS's Authorized Equipment List (AEL). The SAVER Program mission is to provide information that enables decision-makers and responders to better select, procure, use, and maintain emergency responder equipment.

- S&T established TechSolutions to rapidly address the technology gaps identified by Federal, State, local, and Tribal first responders. First responders are able to submit gaps through the website, [www.TechSolutions.dhs.gov](http://www.TechSolutions.dhs.gov). TechSolutions validates capability gaps and first responder priorities by working with a panel of first responder subject matter experts to include the Inter-Agency Board (which comprises over 1,000 leaders from fire, police, emergency medical services (EMS) throughout the United States). TechSolutions fields prototypical solutions in 12 to 15 months; establishes a cost that is commensurate with the proposal (normally \$1 million or less per project); and develops a solution that meets 80 percent or more of the identified requirement.
- S&T receives feedback on first responder needs through the Integrated Product Team (IPT) process, which allows stakeholders from the homeland security enterprise to identify and prioritize technology gaps. Two examples of projects undertaken for first responders are:
  - *Geospatial Location Accountability and Navigation System for Emergency Responders (GLANSER) Project*.—Develops an advanced first responder locating system that includes integrated sensor components and software for visualizing locations and tracks for incident commanders.
  - *Physiological Health Assessment Sensor for Emergency Responders (PHASER) Project*.—Develops an integrated sensor package that will monitor a responder's vital signs such as cardiac rhythm, heart rate, blood pressure, body temperature, and oxygen saturation, which could indicate Pre-Ventricular Contractions (PVCs) or cardiac arrhythmias.

S&T is also creating additional feedback systems for the first responder community to interact with S&T. Specific additions include:

- The establishment of the First Responder Research Development Test & Evaluation Working Group (FRWG), which includes active members of the first responder community. Members help identify and shape first responder specific capability gaps and potential solutions that are undertaken by S&T.
- The FRWG is an integral part of the IPT process that selects the S&T projects that go forward to mitigate First Responder critical needs.
- The FRWG is being expanded from 38 members to 52 members.
- Each of the FRWG members reaches back to his/her constituent groups and professional associations to communicate not only what projects S&T is undertaking but to validate the need and priority of those projects. S&T, in conjunction with the FRWG, is reviewing the most effective and efficient processes to conduct this outreach.
- S&T is expanding the FRWG representation from 10 associations to 12. The 10 associations currently represented are: International Association of Fire Chiefs (IAFC), International Association of Firefighters (IAFF), Interagency Board (IAB), International Association of Chiefs of Police (IACP), National Sheriffs Association (NSA), and Police Executive Research Forum (PERF). International Association of Emergency Managers (IAEM). National Emergency Management Association (NEMA), International Association of Emergency Medical Technicians (IAEMT), and the international Association of Emergency Medical Services Chiefs (IAEMSC).
- Several of the individual working group members also belong to many prestigious National associations and will conduct outreach and solicit input and feedback through their respective associations, some of which are: National Organization of Black Law Enforcement Executives (NOBLE), National Native American Law Enforcement Association (NNALEA), and the National Native American Fire Chiefs Association (NNAFCA).
- S&T is increasing first responders' ability to participate in field demonstrations, tests and evaluation through a new partnership with the Naval Post Graduate School. This close interaction will give the first responder community the ability to make informed observations on the project as it proceeds toward completion.
- S&T Directorate is developing the design and scope of a first responder "Community of Practice" on the FirstResponder.gov website. S&T is also exploring ways in which to expand the membership and interaction on first responder.gov to increase our visibility, outreach and first responder input into S&T efforts.

*Question 8.* S&T currently has the authority to use the research resources of other Federal agencies to determine the best existing solutions to homeland security related issues and to find sources to develop certain DHS security technologies.



Which Department of Defense research labs, other resources within DOD, or other Federal agencies has DHS sought for expertise in sensing technologies and applications?

Answer. See chart below.

Division	Project Name	Fiscal Year	Federal Agency	Facility Name and Location
Infrastructure/Geophysical .....	Advanced Surveillance Systems.	2009, 2010 .....	Department of Defense	Massachusetts Institute of Technology Lincoln Laboratory, Lexington, MA
Infrastructure/Geophysical .....	Underwater Surveillance—Dams and Tunnels.	2009, 2010 .....	Department of Defense	Naval Surface Warfare Center (NSWC), Crane, IA
Infrastructure/Geophysical .....	Geospatial Location Accountability and Navigation System for Emergency.	2009, 2010 .....	Department of Interior Department of Defense	National Business Center (NBC), U.S. Army—Communications—Electronics R&D Center (CERDEC)
Infrastructure/Geophysical .....	Physiological Health Assessment Sensor for Emergency Responders (PHASER) [formerly First Responder Physiological Monitoring].	2009, 2010 .....	Department of Interior Department of Defense	NBC, U.S. Army—Communications—Electronics R&D Center (CERDEC)
Test, Evaluation & Standards ...	Instrument Standards for Chemical Detection.	2009, 2010 .....	Department of Commerce.	National Institute of Standards and Technology, Gaithersburg, MD
Test, Evaluation & Standards ...	Standards Development for Detection and Sampling of Biothreats by First Responders.	2009, 2010 .....	Department of Commerce.	National Institute of Standards and Technology, Gaithersburg, MD
Test, Evaluation & Standards ...	Radiation and Nuclear Detector Standards and Validation.	2009, 2010 .....	Department of Commerce.	National Institute of Standards and Technology, Gaithersburg, MD
Test, Evaluation & Standards ...	Development of a Standard and Measurement Infrastructure for Calibration, Standardization and Optimization of Trace Explosive Detection.	2009, 2010 .....	Department of Commerce.	National Institute of Standards and Technology, Gaithersburg, MD
Test, Evaluation & Standards ...	Metrology and SRMs for Canine Olfactory Detection of Explosives.	2009, 2010 .....	Department of Commerce.	National Institute of Standards and Technology, Gaithersburg, MD
Test, Evaluation & Standards ...	NIST Standard Reference Materials (SRMs) to Support Trace Explosive Detection.	2009, 2010 .....	Department of Commerce.	National Institute of Standards and Technology, Gaithersburg, MD

Test, Evaluation & Standards ...	Information Management, On-Demand Evaluation, and Dissemination System for Properties of Novel Explosives.	2009, 2010 .....	Department of Commerce.	National Institute of Standards and Technology, Gaithersburg, MD
Test, Evaluation & Standards ...	National Standards for X-ray and Gamma-ray Security Screening Systems and Their Validation.	2009, 2010 .....	Department of Commerce.	National Institute of Standards and Technology, Gaithersburg, MD
Test, Evaluation & Standards ...	Standards for Secure and Reliable RFID Communication in Identification Applications.	2009, 2010 .....	Department of Commerce.	National Institute of Standards and Technology, Gaithersburg, MD and Boulder, CO
Command, Control and Interoperability.	Discrete-Element Computing, Privacy and Forensics.	2009, 2010, 2011.	Department of Energy	Sandia National Laboratories, Pacific Northwest National Laboratory (PNNL)
Command, Control and Interoperability.	Experimental Research Testbed Project.	2009, 2010, 2011.	Department of Energy	Sandia National Laboratories; Department of Defense—Space and Naval Warfare Systems Command
Command, Control and Interoperability.	Common Operating Picture (COP) Data Fusion Technologies Project.	2009, 2010, 2011.	Department of Defense	Space and Naval Warfare Systems Command
Command, Control and Interoperability.	Law Enforcement and Intelligence Sensor Fusion Project.	2009, 2010, 2011.	Department of Defense	Space and Naval Warfare Systems Command
Command, Control and Interoperability.	RealEyes Project .....	2009, 2010, 2011.	National Aeronautics and Space Administration.	Jet Propulsion Laboratory, Pasadena, CA
Transition .....	Canary .....	2009, 2010 .....	Department of Defense	Edgewood Chemical Biological Center, U.S. Air Force, Pentagon Force Protection Agency
Transition .....	SNIFFER .....	2009 .....	Department of Energy	Oak Ridge National Laboratory
Transition .....	SPAWAR Situational Awareness.	2009, 2010 .....	Department of Defense	Space and Naval Warfare Systems Command
Chemical & Biological .....	ARFCAM and LACIS .....	2003–2010 .....	Department of Defense	Naval Research Laboratory, Washington, DC

Division	Project Name	Fiscal Year	Federal Agency	Facility Name and Location
Chemical & Biological	Detect to Protect	2005–2009	Department of Defense	U.S. Naval Research Laboratory, Washington, DC
Chemical & Biological	Detect to Protect	2005–2010	Department of Defense	Edgewood Chemical Biological Center, Aberdeen Proving Ground, MD
Chemical & Biological	Detect to Protect	2009–2011	Department of Defense	Massachusetts Institute of Technology, Lincoln Laboratory, Hanscom Air Force Base, MA
Chemical & Biological	Low Vapor Pressure Chemicals Detection Systems.	2010–2011	Department of Defense	Edgewood Chemical Biological Center/Aberdeen Proving Ground, MD
Border and Maritime	Sensor Data Fusion and Decision Aids.	2009–2010	Department of Defense	Space and Naval Warfare Systems Command Pacific (SSC Pacific), San Diego, CA
Border and Maritime	Advanced Container Security Device.	2004–2010	Department of Defense	Space and Naval Warfare Systems Command Pacific (SSC Pacific), San Diego, CA
Border and Maritime	Container Security Device	2004–2010	Department of Defense	Space and Naval Warfare Systems Command Pacific (SSC Pacific), San Diego, CA
Border and Maritime	Sensors & Surveillance	2009–2010	Department of Defense	Naval Surface Warfare Center (NSWC), Crane, IA
Border and Maritime	Sensors & Surveillance	2009–2010	Department of Defense	Naval Undersea Warfare Center (NUWC), Newport, RI
Border and Maritime	Sensors & Surveillance	2009–2010	Department of Defense	Naval Research Laboratory (NRL), Washington, DC
Border and Maritime	BorderTech	2006–2010	Department of Defense	Naval Research Laboratory (NRL), Washington, DC
Border and Maritime	Tunnel Detection	2008–2010	Department of Defense	U.S. Army Corp of Engineers (Engineering, Research and Development Center), Vicksburg, MS
Border and Maritime	BorderTech	2005–2010	Department of Defense	U.S. Army Corp of Engineers (Engineering, Research and Development Center), Vicksburg, MS

Border and Maritime .....	BorderTech .....	2005–2010 .....	Department of Defense	U.S. Army Communications— Electronics Research and De- velopment Center (CERDEC), Ft. Monmouth, NJ
Border and Maritime .....	BorderTech .....	2005–2010 .....	Department of Defense	U.S. Army Night Vision & Electronic Sensors Direc- torate, Ft Belvoir, VA
Border and Maritime .....	Offshore Buoy SBIR .....	2006–2010 .....	Department of Defense	Naval Facilities Engineering Support Center (NFESC), Port Hueneme, CA
Border and Maritime .....	Sensors & Surveillance .....	2005–2009 .....	Department of Home- land Security.	U.S. Coast Guard Research and Development Center (USCG RDC), New London, CT
Border and Maritime .....	Sensors & Surveillance .....	2005–2009 .....	Department of Home- land Security.	U.S. Coast Guard Command and Control Engineering Center (C2CEN), Ports- mouth, VA
Border and Maritime .....	Sensors & Surveillance .....	2010 .....	Department of Trans- portation.	Volpe Center (is the short title), Cambridge, MA
Border and Maritime .....	Advanced Container Security Device.	2004–2010 .....	Department of Energy	Sandia National Laboratories, Livermore, CA & Albu- querque, NM
Border and Maritime .....	Container Security Device .....	2004–2010 .....	Department of Energy	Sandia National Laboratories, Livermore, CA & Albu- querque, NM
Border and Maritime .....	BorderTech .....	2006–2010 .....	Department of Energy	Sandia National Laboratories, Livermore, CA & Albu- querque, NM
Border and Maritime .....	Advanced Container Security Device.	2004–2010 .....	Department of Energy	Pacific Northwest National Laboratory, Richland, WA
Border and Maritime .....	Container Security Device .....	2004–2010 .....	Department of Energy	Pacific Northwest National Laboratory, Richland, WA
Border and Maritime .....	Advanced Container Security Device.	2004–2010 .....	Department of Energy	Lawrence Livermore National Laboratory, Livermore, CA
Border and Maritime .....	Container Security Device .....	2004–2010 .....	Department of Energy	Lawrence Livermore National Laboratory, Livermore, CA
Border and Maritime .....	Passive Coherent Localization	2005–2007 .....	Department of Defense	Air Force Research Laboratory, Rome, NY

Division	Project Name	Fiscal Year	Federal Agency	Facility Name and Location
Border and Maritime	Sensor Data Fusion and Decision Aids.	2009–2010	Department of Defense	Air Force Research Laboratory, Dayton, OH
Border and Maritime	BorderTech	2007–2010	Federally funded Research and Development Center.	Massachusetts Institute of Technology—Lincoln Laboratory (MIT-LL), Lexington, MA
Border and Maritime	BorderTech	2007–2010	Department of Defense	Institute for Defense Analyses, Alexandria, VA
Human Factors	Multi-modal Biometrics Project (formerly Biometrics Project).	2008–2010	Department of Commerce.	National Institute of Standards and Technology, Gaithersburg, MD
Human Factors	Mobile Biometrics System	2009, 2010	Department of Defense	Massachusetts Institute of Technology—Lincoln Laboratory (MIT-LL), Lexington, MA
Innovation	FAST	2009, 2010	Department of Defense	Intelligence Advanced Research Projects Activity, Research, Development and Engineering Command—Night Vision and Electronic Sensors Directorate, Washington, DC metro; Fort Belvoir, VA
Innovation	Cell-All	2009, 2010	National Aeronautics and Space Administration.	Ames Research Center, Moffett Field, Mountain View, CA
Innovation	Multi-Modal Tunnel Detect	2009, 2010	Department of Defense	NORTHCOM, Peterson Air Force Base, CO
Innovation	MagViZ	2009, 2010	Department of Energy	Los Alamos National Laboratory; Los Alamos, NM
Explosives	Canine Training Aids	2010	Department of Defense	NAVEOD Technical Division, Indian Head, MD
Explosives	Metal-Insulator-Metal Ensemble (MIME) Sensor & Test Bed.	2008–2010	Department of Defense	Naval Research Laboratory (NRL), Washington, DC

Explosives .....	Multi-Assay Enabled Wide Area Sampling and Testing.	2010 .....	Department of Defense	Defense Advanced Projects Agency, Arlington, VA RedXDefense, Rockville, MD	Research
Explosives .....	Explosive Detection System (EDS) Data Collection.	2007-2010 .....	Department of Defense	Air Force Research Laboratory, Tyndall Air Force Base, Panama City, FL	

*Question 9.* Since October 2008, S&T commercialization and industry outreach and collaboration efforts have been handled largely through the DHS SECURE Program and other similar efforts.

Under your leadership, how will S&T expand its work with private industry to develop new capabilities that may be of benefit to DHS and first responders?

Answer. The SECURE™ program enables collaboration of public and private entities to develop products, technologies, and services rapidly for DHS stakeholders. In fiscal year 2009, the SECURE™ program generated eight Operational Requirements Documents (ORDs). S&T plans to expand SECURE™. In fiscal year 2010, the program expects a minimum of ten new SECURE™ ORDs and 20 ORDs in fiscal year 2011. In fiscal year 2012, the program plans to generate and vet an additional 25 ORDs.

Below is a list of ways that the Science and Technology Directorate (S&T) will work with private industry to develop new capabilities that may benefit the Department of Homeland Security (DHS) and first responders:

- S&T outreach efforts center on notifying the private sector about opportunities that exist for partnership and business development to address the needs of DHS, the first responder community, and critical infrastructure/key resources (CIKR) owners and operators. These outreach efforts are conducted through invited talks to trade conventions, reaching small, medium, and large businesses. Efforts also extend to meetings with minority, disadvantaged, and HUBZone groups on a regular basis.
- DHS routinely publishes and makes available the unsatisfied needs and wants of S&T's stakeholders through the publication of the "High Priority Technology Needs" (dated May 2009) book, which assists in the communication of needs throughout the Department and externally to the private sector when appropriate.
- S&T issues Requests for Information (RFIs) and Sources Sought notices to gather information on the current state of technology industry-wide as well as to collaborate with industry on development proposals. These mechanisms are normally followed by a request for proposal if there is indication a Government need can be met.
- S&T uses the Long Range Broad Agency Announcement (LRBAA) to give industry an acquisition vehicle to communicate with S&T on its technology proposals to meet current requirements, and this also allows S&T to screen industry for any new break-through technologies that may enhance or exceed current development efforts.
- The Small Business Innovation Research (SBIR) Program reaches out to small, innovative businesses to fund critical research/research and development stage and it encourages the commercialization of technologies, products, and/or services. Similar to the research and development (R&D) programs of S&T, SBIR topics generally address the needs of the seven DHS operational units as well as the first responder community.
- S&T leverages its TechSolutions Project to rapidly address the technology gaps identified by Federal, State, local, and Tribal first responders. The TechSolutions Project fields prototypical solutions in 12 to 15 months; establishes a cost that is commensurate with the proposal (normally \$1 million or less per project), and develops a solution that meets 80 percent or more of the identified requirement.

*Question 10.* How has S&T incorporated the findings and recommendations of the 2009 National Academy of Public Administration report into current operations?

Answer. The Science and Technology Directorate (S&T) has taken several steps to address the National Academy of Public Administration's (NAPA) recommendations in the 2009 report on S&T. Primarily S&T is actively engaged in a strategic planning effort that includes the development of an investment review process including a redefinition of the way performance is defined and measured; a review of the Directorate's functions, organizational construct, and business practices; and a renewed focus on coordinating the homeland security research and development (R&D) activities across the Federal Government.

S&T is developing its strategic plan by first reviewing the entire planning process from vision and mission to goals and objectives. The strategic plan will help S&T determine if the organization is properly shaped to meet its mission efficiently and effectively. This plan will incorporate recommendations from the NAPA study and results from the Quadrennial Homeland Security Review (QHSR), released in February, 2010. It will help determine if the right business practices are in place to facilitate the work. The QHSR lays out a DHS-wide strategic framework to guide DHS activities. The QHSR framework provides a foundation for the development of



long-term strategic goals for S&T. S&T plans to have a final version of its strategic plan implemented prior to fiscal year 2011.

S&T has already taken several steps toward completing its strategic plan. S&T has formed a steering committee familiar with S&T operations to provide direction and logistics for the strategic plan. S&T has set an aggressive goal to complete several internal planning sessions or forums and an employee survey that ensures active participation S&T-wide. An independent, third-party subject matter experts (SMEs) team has been selected to work with the steering committee and provide analysis of gathered information. The SME's have completed reviews of other research and development (R&D) agencies' plans. Stakeholders, both internal and external to DHS, have been identified and will be interviewed. Stakeholders will consist of DHS internal operational partners; Congressional staff; other Federal agencies; a cross-cut of the homeland security enterprise, as time allows. These activities are the foundation to completing a strategic plan by fiscal year 2011.

Repeatable portfolio analysis is critical to S&T's strategic planning process. Portfolio analysis will allow S&T to improve the efficacy and efficiency of its research investment. S&T is engaging a third party to perform an initial, independent portfolio analysis. The result will be a process and method for repeatable portfolio analysis. The selection of the portfolio analysis performer is expected in early April 2010.

To help improve S&T program performance metrics, S&T contracted with the National Academy of Science (NAS) to develop a framework of metrics for S&T to better plan and evaluate its research activities. An important element of R&D planning is development of appropriate metrics, defined as a system of measures of the impact of research, to inform evaluation and improved decision-making. The NAS study began in April 2009 and selected the members of the committee in August, 2009. The committee, chaired by Dr. Carl Pister, held its first meeting on September 1 and 2, 2009. The study is scheduled to conclude in April 2011.

As Section 302 of the Homeland Security Act of 2002 describes, the Under Secretary for Science and Technology has the responsibility to develop strategic plans for homeland security R&D. In response to this mandate, S&T published "Coordination of Homeland Security Science and Technology" in December 2007 (revised January 2008), which reported the roles and responsibilities of Federal agencies, as well as initiatives underway to counter threats to homeland security. S&T is currently revising this 2008 effort in conjunction with the QHSR.

As DHS developed the QHSR, S&T working groups began to update the National level strategic plan. Divisions within S&T have compiled input with their inter-agency partners. The working groups are also performing the following tasks:

- Define the process for drafting a National-level Homeland Security Science and Technology Plan;
- Articulate a vision of the outcome of that process in terms of the criteria that the final plan must meet; and
- Define key terms and phrases for the plan development process.

S&T is engaging external partners to inform this strategic research plan. S&T is in consultation with OSTP, including the Executive Director of the National Science & Technology Council (NSTC), to discuss the plan details and coordination efforts for the plan across Federal partners. SMEs from DHS's Federally Funded Research and Development Center (FFRDC) have provided plan support by both developing a framework and through on-going analysis of input from inter-agency working groups and councils.

In addition to the above steps to implement NAPA recommendations, S&T has already realigned the programs addressing first responder requirements gathering and technology development under the Interagency Division and defined roles and responsibilities to ensure a coordinated effort. S&T has established a new goal of achieving 75 percent or higher of all project milestones each year. These project milestones are determined by program managers at the beginning of a project and reflect the key achievements needed to reach a desired end-state. S&T has further opened up the lines of communication between staff and senior management through the use of a suggestion mailbox read by the S&T Chief of Staff.